THE SEVENTH GRADE

All that follows has doubtless been said many times, but must needs be repeated. Do we wish our students to have a live, active interest in plant life and its relation to man? How important is that interest? Would a more general and intelligent interest in plant life make for qualities of character and points of view of which we find ourselves in need as we consider the growing ideals of citizenship? What emphasis should a study of plant life receive in school? To establish a real interest, how early must we begin and how must we proceed? It is a matter of common knowledge and experience that the old traditional botany courses, as a method of teaching about plant life, fail. Dr. John D. Coulter says, in his preface to *Plant Life and Plant Uses,* "Boys and girls, by mere accumulation of organized knowledge about plants, may never come to that appreciation of plants as a part of life which is believed to be very desirable." Though there has long existed general agreement concerning these facts, and nature study and school gardens have been prescribed and tried as solutions to the problem, we still find ourselves wondering why young people, though perhaps interested for the time being, and in some cases indicating more than a passing interest, do not more generally seek voluntarily to come in contact with plant life and its study.

Doubtless much, or most of the time given to so-called nature study has been devoted to mere observation, not impelled by curiosity or a keen desire to know, but directed by the teacher who was endeavoring to teach certain facts required in the course of study. The school garden remains our chief source of hope. There it is that the boys and girls can, through their own activity, have the joy of touching and smelling the earth and of watching the wonder of germination and growth. There it is that they can observe living organisms, form and color in all their diversity and variety. There it is that their craving for beauty can at least in some small measure be fed. The need for expression in drawing and painting, modeling and making, singing and dancing, is an accepted theory, well considered and provided for in all good teaching. The addition of the art of gardening as a form of expression needs yet to be made.

So far, the school gardens have most generally been used to teach agriculture or truck-gardening, with emphasis on economic values, or

to teach isolated facts about soils, plants, insects, etc. Surely, the love of beauty is instinctive, and this we may not forget when we consider the school garden. What other opportunity so wide and adequate offers itself for the teaching of the esthetics which will beautify our city windows and gardens, and our farm roadsides and dooryards? It is only when interest in and love for plant life is part of our child-life that it endures. Man may travel devious paths in search of those interests which lead to the great vistas and inspirations of life, but his garden is a broad and certain gateway to beauty, ever-widening horizons, and finer human relations.

With such an activity to engage one's efforts, it remains to help the boys and girls choose wisely from the numberless problems which present themselves with much insistence. The making of the school garden is the center for most of the science and geography work of the seventh grade. However, before presenting the plan of the year's work, it may be well, in answer to inquiries which are frequently made, to insert some general remarks about the garden as a project in this school.

Our membership has grown and our available garden space has gradually decreased to make room for other outdoor activities also necessary to the life of the school (houses for the museum, the wireless club, first-grade playhouse, etc.). These changed conditions could not practically and fittingly be met by the use of our old garden plan.*

The plan used then provided an opportunity to consider each child's choice, so that he might express himself as an individual, esthetically, commercially, or scientifically; it provided space for classes to work as such on a class problem; it planned, for the sake of appearance and better product, to have all children making similar choices plant in the same sections; it attempted to give each individual all necessary assistance.

Since that time many changes have occurred affecting the garden experiences of our children. The use of the old plan meant too many children working in too small a space, duties too limited, and interference so constant and discouraging as to destroy the respect which any good work should receive. The old plan also required, especially from grade teachers a high degree of co-operation, which sometimes was necessarily artificial or forced. Since neither the experience nor the training of class teachers, except in individual cases, gives them a vital interest in plant life, the farm, and the garden, it is a mistake

*Described in detail in the *Elementary School Teacher*, Jan., 1906.

to expect them to be of great assistance. Therefore, it has been necessary gradually to reorganize the work so that a better adjustment may be made between what we can hope for from our school garden and what we can really get.

Is the real function of a school garden different after all from that of any other garden? If it does not make its appeal through its esthetic, economic, and social values, is it worth having? Is it possible to utilize our time and space, however limited or small, so that our boys and girls can be led to feel the beauty of the garden, to like plants and actively to contribute to the home or the community by planting and caring for them? Can they be led to like appropriateness of surroundings out of doors so that they can diagnose ugliness, prescribe a remedy and obtain a fitting and beautiful result?

A school in the city must take into consideration a very short season for gardening in the spring, and a long absence from school during the summer months. Frequently the care given the garden in the summer is inadequate. A greenhouse for tiding plants over the winter is often impossible. For these and other reasons, emphasis on garden work should be heavy in the spring. By careful planning, the garden can be made especially beautiful in the early spring and again in the fall, when the children return to school. Laboratory work, and classroom discussion, can be emphasized in the winter quarter to give more time for actual gardening in the spring and fall.

So far the school has provided some outdoor planting experience every year for every child through the first seven grades. Thereafter it has fostered only special interests by giving plots to older students who wish to give their leisure or vacation time to such work. The kindergarten and first grade have small plots of their own and grow corn, popcorn, pumpkins, etc., to feed to their pets; they also grow a few flowers easy of culture. Grades two to seven plant the vegetable garden and when called upon help to beautify neglected spots on the school grounds. The seventh grade cares for the flower garden and the grounds in front of the school building. They prepare and plant the hotbeds which supply the school, home gardens, and window-boxes. Bulbs for house culture are distributed every fall. The narcissus, which can be grown in bowls filled with pebbles or fibre and water, and which blooms in four or five weeks, is of course the favorite. This fall, the hotbeds were filled with a variety of bulbs; single and double, parrot and reflex tulips; hyacinths; jonquils; scillas; snowdrops;

daffodils; and Easter lilies, which were brought into the schoolrooms in February, to be forced into bloom for Easter.

About five or six hundred two or three-year-old trees are distributed every spring for Arbor day, at a penny each. These are all planted in home gardens. Though many do not survive, enthusiastic reports come in from successful planters. A number of trees are now fifteen or more feet high, and their owners, the alumni, report their growth with pride. Some special trees, shrubs, or vines, are planted every year by the May Queen, as the gift of the Senior class to the school. The high-school students and men of the faculty spend a Saturday in the garden in the spring doing work too heavy or too difficult for younger children. They do heavy spading in the vegetable garden, haul manure, lay out beds, make paths, mend and paint fences, etc. The high-school girls prepare a luncheon and help to make the day one of wholesome, purposeful labor and of genuine social worth.

The year's work in the seventh grade subdivides itself into the following projects:

I. The harvesting and general observation of the fall garden lead to the giving of two morning exercises in October. The first is organized to make a careful report to the school of the work done in the garden by each group and of the outcome of this work as a part of the harvest. This exercise is directly followed by another, given by the seventh grade, on the year's world crop reports. On the same day, the "County Fair" takes place, described in *Year Book,* Vol. IV, p. 23.

II. Clearing the vegetable and flower gardens for winter and for planting of spring garden.

III. Planting of bulbs and perennials and covering for winter protection. Planting of bulbs for indoor forcing.

IV. A review and organization of science experiences of previous grades into a more orderly, complete body, using the laboratory to answer questions.

V. Close observation and care of spring garden, and planting of summer and fall gardens.

I. *The Year's Crops.*—Consideration of our garden crop naturally brings to mind such questions as, How much food do I eat in a day? In a week? In a year? Can I picture concretely that amount? In what proportion do the great staple products appear? How much food does my home use in a year? Our city? Is it possible to think,

in terms of bulk or measure of any kind, how much food the world needs? Who does all this work of production? Where are the great important staple crops produced, and why?

The study of the contribution of the various countries to the world's food supply opens the field of problems involving the interrelation of food production and climatic conditions. Definite questions concerning air and water relations are brought up, which are answered in subsequent laboratory and classroom work. Geography also has a real significance here. The study of this question includes practically a review of the geography of the world. Climatic relations are constantly in evidence and numerous facts are mentioned as such without discussion of causes and relationships; for example, barley and rye appear in the list of certain products of Russia and Germany. The reasons for this are mentioned but not fully discussed in this preliminary work. The exact reasons are more fully set forth in the detailed study of climate, air, water, and soil made in the laboratory during the winter quarter. Mathematical geography and the history of the development of geographic knowledge are topics studied in this connection.

II. *Fall Gardening.*—The garden must be cleared before an early frost comes, so that our planting may be done. What shall we do first? If we clear it before the frost shows us what will be killed, how can we know what to pull up and what to leave? Why do some plants die and others live through the long, hard winter? What are annuals, biennials, perennials? Are some plants annuals in some latitudes and perennials in others? Do some plants naturally require more time to grow up, to mature, just like some animals? Why? Does this difference in time show itself in the results accomplished by the plants? What are herbaceous plants?

Shall the dead annuals be saved for covering or not? Would it be better to burn them for fertilizer? If they are scattered about do the seeds sometimes self-sow? Are some plants troublesome in this way? To clean the fences, we must pull off the annual vines. How can we tell them from the perennial climbers? How many of each do we have on the school grounds? What does a plant gain by being a climber? Shall the soil be spaded or not? Shall fertilizer be added? What is the best fertilizer for bulbs? For perennials ?

Our school closes about the middle of June. What plants, that will surely blossom before school closes, shall we choose to make our garden beautiful for spring?

III. *Fall Outdoor and Indoor Planting.*—What bulbs and plants that blossom in the spring are planted in the fall? What is a bulb? What work does it do? Does it do more than store food for the coming season? Does it form its flower before the winter comes, or in the spring? Can we, with the use of the magnifying-glass, see the flower in the bulb when it is cut open? If it doesn't form its flower by fall, can it blossom in the spring? Why can we not use forced bulbs the second season? Why can some bulbs be forced in water in a few weeks and why do others need to be stored in a cold, dark place for several months before forcing? How much work can bulbs do under the snow and ice in winter? The root growth made in winter out of doors is always a great surprise, and so also is the rapid growth of leaves and blossoms made after bringing the bulb into the heated room.

These observations lead to such questions as: Why do we have finer wild flowers some years than others? Does nature always successfully provide plants with protection against sudden changes in temperature or other irregularities in the weather? If not, what happens? Are there evidences of such histories to be seen in the woods? Are some annuals or perennials good for house forcing? What kinds? Do we ever force bulbs or plants which naturally bloom late in summer?

There are always questions which lead to the idea of the chemistry of growth. These are given such attention as may encourage further observation and which will clearly indicate the relation of chemistry to growth.

Can we tell by looking at a plant or bulb how it should be transplanted? Are there signs or marks of any kind to show how they were planted before? Has the size of the bulb anything to do with the depth of planting? What happens when the bulb is planted too deep? What happens when it is planted too near the surface? A few bulbs in the garden were found on top of the ground when the snow disappeared. How did they get there? What pushed them out? What can be done to aid a plant or bulb newly set out? What might hinder its growth or kill it? What bulbs or plants can live through the winter without covering? With covering? Not at all? What makes good covering?

Some time is spent on the study of plants, their history, the bulb industry and its place and magnitude in the work of the world.

IV. *Review and Organization of Science Experience With Laboratory Work.*—The urgent questions arising from the garden project, together with a growing desire of the children to relate their vari-

ous science experiences, require a simple organization of earlier work, and the addition of such experience and subject matter as a more advanced attitude requires. This organization serves to widen their mental horizon and at the same time reveals new relationships.

The children have had some first-hand contact with land forms, plant life, animal life, agriculture, horticulture, meteorology, astronomy, geography, physics, chemistry, and methematics in their excursions, travels, and activities in and out of school. But the actual handling of laboratory apparatus, to ascertain facts and the reasons for them, has not been very extensive. It is therefore important that the children should become better acquainted with the experimental method. The pertinent questions arising from the grade project offer excellent opportunities for this kind of study.

The laboratory work is organized on the basis of the four great divisions: atmosphere, water, life, soil. These are of course all interrelated and are not taken up as units or in any formal order.

It is not the purpose of this report to describe all the experiments given in the laboratory, but only to state enough of them to show that by means of experiments the children can solve many of the problems which confront them.

(*a*) THE ATMOSPHERE.—The general topic of the atmosphere and the need of experiments in this field may be introduced by means of such questions as these: Do our senses always tell us the truth? Since we cannot see the atmosphere, does that prove there is none? How can we prove there is an atmosphere? The discussion leads the child to the conclusion that the only way to find out is by means of experiment, and that the atmosphere is a fertile field for experimentation. The questions raised by the children offer many suggestions as to procedure. Of these, the following are typical:

What is the atmosphere, and how do we know there is an atmosphere?

Experiment.—Show with a vacuum-pump what happens when air is exhausted from a square gallon can.*

Experiment.—Set up a mercury barometer. Weigh the column of mercury from the barometer. Measure the area of the end of the barometer-tube, and compute the weight of the column of mercury in a tube with an end area of one square inch. Find the pressure of the atmosphere as determined by the average results of the experiment.

*If no vacuum-pump is available, pour a small amount of water in the can and boil for a few moments, until the steam has displaced the air. Then place an air-tight stopper in the can. As the steam condenses a partial vacuum is formed and the can will collapse.

Let each child keep the barometric readings and weather conditions for a period of time and plot a curve. Note conditions of weather on all points on the curve. Can any deduction be made as to the kind of weather which accompanies high and low barometer? In this connection weather-maps are studied.

Of what does the air consist? Is there much oxygen in the air?

Experiment.—The teacher may demonstrate the approximate amount of oxygen in the air. Invert a cylindrical jar over a piece of wood which is floating in water. Place a length of magnesium ribbon on the wood and ignite. Does the amount of air in the jar become smaller? What is the approximate amount of oxygen in the air.

Is the air all oxygen? The other constituents of air are mentioned.

How pure is the air, and what are some of the impurities present?

Experiment.—The teacher may show that the air is impure by drawing a stream of air through a funnel, over which there is stretched a cloth gauze and a layer of wet filter-paper. Which is more free from dust, city or country air? How does the lake breeze improve Chicago's air?

In addition to the above properties of air, the following questions may be studied in like manner and a broader application made: Why does hot air rise? What causes winds? What are cyclones and tornadoes? What work does the wind do? A discussion of the latter question involves a trip to the sand-dunes and the lake shore.

(*b*) WATER.—The subject of water is naturally introduced through the garden project. The amount of water in the ground under varying conditions of temperature, soil porosity, and dryness of the atmosphere offers many interesting problems. The subject may be introduced by having the pupils recall the three forms of water. Such questions as these are asked: What is the difference between boiling and evaporation? Between water-vapor and steam? Why does the amount of water-vapor in the air vary? What effect has this upon evaporation?

These questions, together with those dealing with distillation and condensation, lead to a discussion of a number of problems such as: Why is rain fall heavier in certain places than in others, and why is the ocean salty? What becomes of rain-water?

Experiment.—Let each child pour water on a box of clay and observe that some runs off as surface water, some becomes ground water, while some is evaporated. With silver nitrate test for hardness the water which seeps through.

Which kind of water accomplishes the most mechanical work? To answer this question, use is made of the sand-table or a stream out of doors. Discussion of work of running water naturally follows and the reason why river valleys and deltas are fertile is brought out.

Other points to study about water are: Its chemical composition; how the small capillary tubes in the soil make it possible for a plant to get water; atmospheric water, clouds, dew and snow.

(*c*) LIFE.—In the garden the children come in contact with various aspects of plant and animal life, and begin to realize the wonderful adaptation of this life to its environment. The natural desire on the part of the children to know something about the life of the past and the change from past life forms to present ones, is the reason for making a brief study of prehistoric life. In this study the effect of changing environment upon life forms is emphasized.

The purpose of this historical study is fourfold: First, to satisfy a curiosity about prehistoric life; second, to make museum specimens intelligible; third, to show development of life and the dependence of life upon environment; fourth, to furnish a background for the work in the eighth grade.

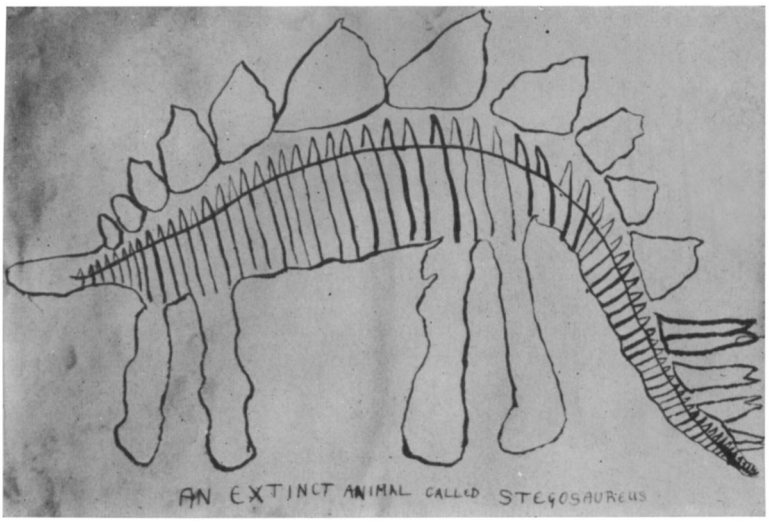
For these reasons an outline of the five eras of earth history, and the periods of the last three eras are given. Since the names are difficult, the derivation and meaning of each are explained.

1. *Azoic* (without life).—We speak of the azoic as a very long era, in which vulcanism was probably the dominant feature. We learn to recognize the most common igneous rocks; such as lava, obsidian, granite, pumice, and ash.

2. *Archeozoic* (dawn of life).—This era is spoken of as one of very long duration. Running water, the wind, and the other agencies were at work. The era stands out as one of the great folding and faulting, also as a period of some vulcanism. We learn to recognize specimens of gneiss, schist, slate, quartzite, shale, sandstone, limestone, and conglomerate. Under what conditions is each formed? What is a sedimentary rock? What is a metamorphic rock? What evidence of life is there in the archeozoic era?

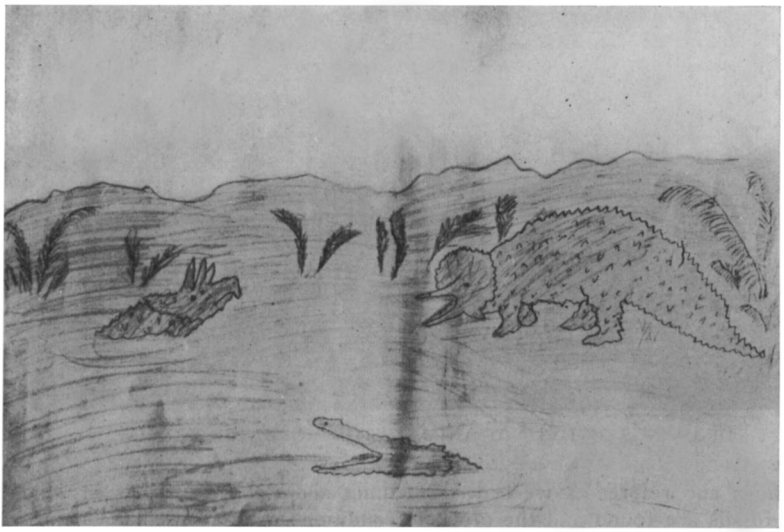
3. *Paleozoic* (very old life).—Under the paleozoic seven divisions are mentioned: Cambrian—named after an outcrop in Cambria, England; Ordivician, named after ancient tribe of Ordivicii in Wales; Silurian, named after ancient tribe Silurii, in Wales; Devonian, named after outcrop in Devonshire, England; Mississippian, conspicuous system of rocks in the Mississippi Valley; Pennsylvanian, the conspicuous system or rocks in Pennsylvania; Permian, named from outcrop in Permia, Russia.

4. *Mesozoic* (middle life).—Three divisions are given: Triassic, named from the three formations which occur in Germany; Jurassic, from the out-

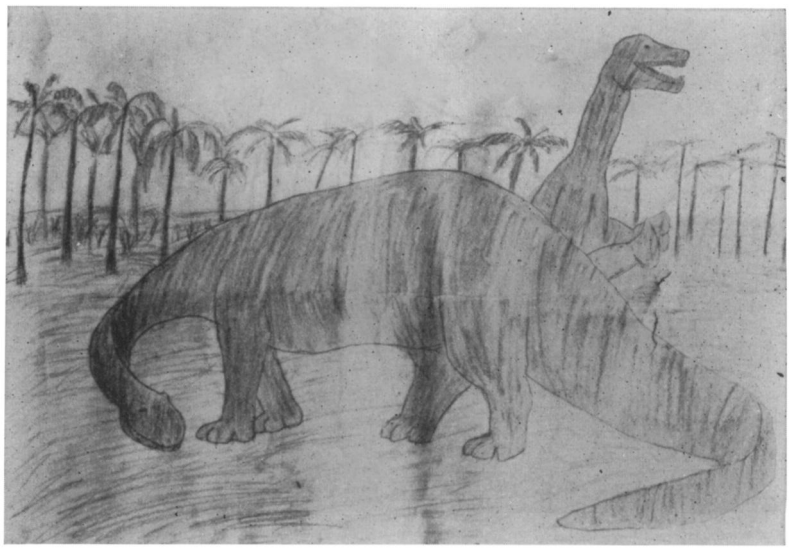


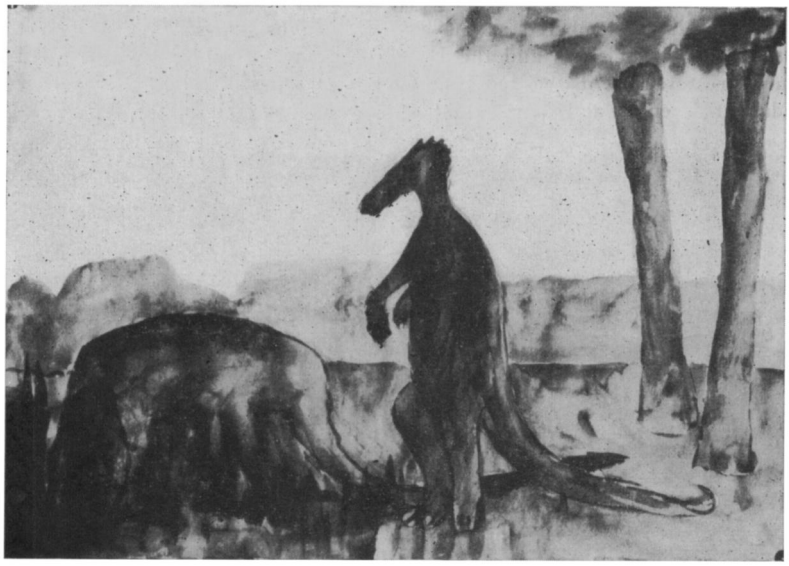
crops in the Jura mountains; Cretaceous, from the chalk formation in England and Germany.

This era is remembered as the era of saurians, or reptiles. We visit the Academy of Sciences and the Field Museum to see the skeletons and pictured restoration of the reptiles. On our book-shelves we keep many standard references and publications of various museums. From our ex-



DRAWINGS OF EXTINCT ANIMALS FOR MORNING EXERCISE





DRAWINGS OF EXTINCT ANIMALS FOR MORNING EXERCISE

cursions and references we learn something about the conditions in which the fossils are found and the probable conditions which caused the animals to be entombed and become fossilized. We review certain facts which lead

men to believe that they know something about the landscape of prehistoric times. The entire study is for the most part descriptive.

To make clear the purpose of naming the periods under each era, it may be well to give an illustration. A certain fossil in the museum is labelled, *Dinosaur—Triassic—Jurassic.* The child at once tabulates the animal as having lived in the mesozoic era, which is late in the world's history, rather than that it is just "prehistoric."

5. *Cenozoic* (recent life).—The divisions mentioned are: Eocene, Miocene, Pliocene, and Pleistocene. We speak of this as the era of mammals. In this connection we trace the development of the horse, as shown by fossils. We also note the apparent evolution of birds from reptiles. Emphasis is placed on evolution and its connection with climate and physiographic conditions.

This life-study culminates in a morning exercise on prehistoric life, or in a lecture by an authority on paleontology.

In this study we make use of the information we gained when studying running water. We note how earth materials carried by the streams to lakes, oceans, and lowlands can there be deposited as sediment; how this may be reworked by waves and winds, and then laid down in beds; how animals' remains may be imbedded in these sediments, later to be fossilized; how beds of Cambrian rocks may lie upon Archean and all the others above in order, or how they may easily be formed out of their regular order in the column; how horizontal beds may be formed on upturned beds; what the coal measures mean, how they may get out of the horizontal position, and what they tell us about prehistoric climate.

These questions make necessary a brief study of folding and faulting as probably caused by shrinkage or tension of the earth's crust.

We begin a brief examination of the United States Geological Survey folios, choosing those which are typical of the different regions in the United States. The children observe that the beds are practically undisturbed in some regions and very much disturbed in others. A report of each region is made to the class by pupils who have been in those regions. For example a child who had visited in Texas reported the principal facts as she found them in the Uvalde Folio, Texas.

The children are encouraged to study the folios of the regions where they plan to spend their summer vacations. A number of inquiries have been made as to whether folios of the regions to which they are going are available.

(*d*) SOIL.—The garden project furnishes the next important subject for investigation. Of the problems studied in this connection, the following are those which are solved by means of experiments in and out of doors. Of what does soil consist? To answer this, we take samples of soils from the different areas in the vicinity of Chicago and examine them under the microscope. We note that soil is made up of a greater or smaller amount of inorganic material, dependent upon the source of that soil. For salt content we test one of the soils, preferably one of clay, by means of silver nitrate, as in our water experiment.

How is soil formed? We go to the lake shore and see soil being made mechanically, and then we go to our garden and see the vegetable matter decaying, and note that soil may be made by the process of chemical action.

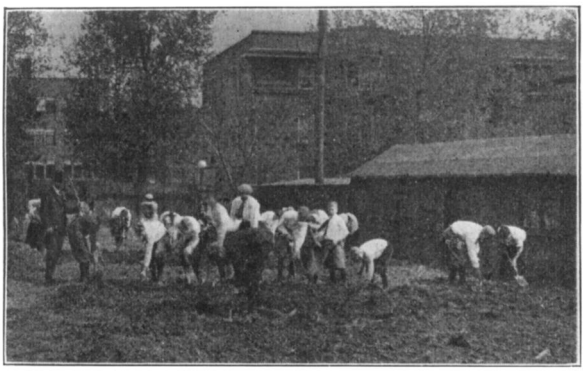
What makes the soil black? In answer to this, we pour a small amount of sulphuric acid on vegetable matter of different kinds. We note that they all turn black. We explain that the sulphuric acid produces a very rapid decomposition, and that the resulting product is similar to that of the slower decay.

Does soil hold water? What does porosity of soil mean? Is a soil which is very porous a good soil? If so, under what conditions? What is a thin soil? How can a thin soil be improved? What is a subsoil? How can soil be made to retain water? Is a fertile soil without water-holding power practical for cultivation? What becomes of a soluble fertilizer which is used on a very porous subsoil?

What is a hotbed? What makes it hot? Does the decomposition of organic matter affect the temperature of soil? Does it make any difference whether or not the decomposition of the organic matter is just started or is complete? What kind of manure is required for a hotbed?

Do all plants need the same kind of soil? What is an inorganic fertilizer? What is bone-meal? Lime? What is the purpose of each as a fertilizer? What is the value in deep plowing? Is it a good thing to plow under the last year's growth of weeds, cornstalks or wheat straw? What is dry farming? Why should the soil be cultivated? When should one cultivate deeply and when shallowly? Under what conditions is rolling a good thing?

These problems are merely suggestive of some of those which come up in connection with the study of soil. The application of the information gained is made in the garden.



PREPARING THE VEGETABLE GARDEN

V. *Planting and Care of Garden.*—What are the first signs of growth at the return of spring? How early do we see them in this latitude? What is the green that you see creeping into all plant life, even before the snow disappears? What is chlorophyl? What is protoplasm? Can we see it at work under the microscope? What effect has the sunlight on plant-cells? Have mushrooms and toadstools chlorophyl? How do they live? What kind of service do they render? What is the green in water? What are algæ? What is the green on barren rocks? What are lichens? What are mosses? How do all these plants multiply? Can we see this multiplication going on under the microscope? What are ferns? Why do ferns have seeds and no blossoms? What are spores? How do they sprout? What are seeds? How do they sprout? What kind of plants come from monocotyledonous seeds? From dicotyledonous seeds? Why do some plants have so many seeds and some so few? Can plants which produce few seeds protect them in special ways?

What methods of protection against changes in temperature and rough winds can we discover in the newly appearing growth? When and how shall we uncover artificially protected plants? What can we do to help nature to produce strong plants for early maturing in the vegetable garden and early flowering in the flower-garden? Which seeds should be planted in a hotbed? Which in a cold-frame? Which in the open ground? Which can be planted with success in either?

How is a hotbed made? (See IV (d) Soil.) What is a cold-frame? How made? How must we plant seeds to get the best results? What can be done to aid in scattering evenly very fine seeds? How

much room do seeds need in a hotbed or cold-frame? Why does a toad usually come and stay in a hotbed? Shall we leave him there or try to keep him out? How do so many weeds get into the hotbed? Do some seeds survive in manure? Here a study of the seed industry is made. How can we test our seeds? How do farmers insure getting good, clean, clear seed? Why does it pay them to test their seeds?

What is the condition of a plant taken from a hotbed? How do hotbed conditions compare with those out of doors? What can you do to prepare plants in the hotbed for transplanting out of doors? What can be done to aid plants in recovering from the shock of trans-

PLANTING ACTIVITY

planting? What factors in transplanting cause the severest injuries to the plant? What must we know about plant habits to guide us in placing and spacing plants? How does speed of growth in a hotbed compare with speed in the open air? How do conditions and appearance of plants change after transplanting? Why? Are there some which cannot stand transplanting at all? Why? Why do we find so many grubs near the surface when we transplant? Shall we leave them or destroy them? What indications appear in the garden to warn us of plant injury by insects or birds? Do insects and birds ever help plants?

The bulbs planted in the fall blossom in April and May, when

the children watch enthusiastically for each blade and leaf as it pushes up through the scarcely thawed ground. The garden early becomes a beauty spot with its dainty crocuses, scillas, narcissi, daffodils, and jonquils. These give place to the gay tulips, bleeding-hearts, iris of many hues, peonies and other perennials which gladden the eye in the later spring days.

By the end of May the spring garden is passed. The bulbs must be carefully dug up, spread in the sun to dry, labeled, and put away for the summer, to be planted again the next fall.

Then come the spading and weeding of the beds preparatory to transplanting from the hotbeds and sowing in the open ground the

BEAUTIFYING A NEGLECTED SPOT

seeds of those plants which will blossom during the late summer and make the garden a profusion of flowers in the fall when the children return to school.

The children transplant from the hotbeds into the garden-beds, zinnias, petunias, scabiosa, asters, cosmos, marigolds, snapdragon, celosias, salvia, nasturtiums, bachelor buttons, poppies, and other late flowering plants, and border the beds with sweet alyssum, ageratum, dwarf nasturtium, etc. By the fences they plant moonflower, morning glories, Australian pea-vines, scarlet runner, and other trailing vines.

The tender transplanted plants need careful daily watering until they are rooted. The beds must be weeded and all be in good order by the closing day of school. Through the summer months a few of the children who live in the neighborhood come occasionally to weed. The bulk of the summer work must, however, be left to the janitors.

So, by means of careful selection and planting, and good growing weather, one can have in the school garden a succession of beautiful flowers, from the early snowdrops and crocuses which come with the melting of the snow to the late flowering cosmos, hardy chrysanthemums, asters and zinnias, which brave the first frosts and earliest flying snows of autumn.

SEVENTH GRADE REFERENCE LIST

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